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Case No. _____

SUPREME COURT, U.S.
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IN THE

UNITED STATES SUPREME COURT

Timothy B. Whitmore,

Petitioner Pro Se,

v.

Pierce County Department of Community Corrections, et. al.,

Respondents.

On Petition for Writ of Certiorari to the United States Court of Appeals for the Ninth Circuit:

SUPPLEMENTAL BRIEF

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§ i. TABLE OF CONTENTS

Page

§ i. TABLE OF CONTENTS ..... i-ii

§ ii. TABLE OF AUTHORITIES ii

1. A MATERIAL FACT CONCERNING THE PIERCE COUNTY SUPERIOR COURT THAT HIGHLIGHTS THE OBVIOUSNESS OF MY COMPLAINT 1-3

2. CORRECTION OF AN INCORRECTLY REPORTED MATERIAL FACT DISCOVERED IN ONE OF THE WESTLAW CITATIONS TO MY CASE 3-6

3. THE REFERENCES FOR *§ 5.2, STATEMENT OF FACT* THAT WERE INADVERTENTLY LEFT OFF THE ORIGINAL *PETITION FOR WRIT OF CERTIORARI* 6-7

4. SUMMARY OF ARGUMENT 8

5. CONCLUSION 8

6. SIGNATURE DECLARATIONS 9

APPENDIX

§1. CITATIONS FROM SPECIAL AUTHORITIES

§ 1.1 Citations from Neuroscientists on Retainer at the Dept. of Justice 1-50

§ ii. Table of Authorities

Pierce County v. State of Washington, 144 Wash. App. 783, 185 P.3d 594; Thurston County Superior Court Case No. 03-2-00918-8 (10 Feb. 2006).

§ 1. A Material Fact Concerning the Pierce County Superior Court That Highlights the Obviousness of My Complaint

This section provides additional information about the inclusion of the Pierce County Superior Court as a defendant that makes the nature of my claim very clear.

I filed a motion (*Dkt. 54*) with the appeals court on 4/11/2008 to eliminate the Pierce County Superior Court from the list of defendants. This motion was denied (*Dkt. 57*) on 4/22/2008. This decision served to maintain the record of the following quote from that court's 12/3/2004 probation revocation hearing:

> THE COUNTY COURT: *"All right. You know, if you have mental health issues you take medication. It's not something you choose to do because if you don't then you'll act out ... When you're out in the community you're to take your medication and apparently when you're in custody you can't do that." Appeal 14/30 E.R. III Dkt. 107-1 p. 68 (D.C. Dkt. 107-1 Tab 3 p. 5).*

This was an odd comment for the county court to have made because I don't need a lecture to take my medication when I'm out on my own. I had been working on a home building project prior to being jailed. Because of the level of physical effort required by that project and the need to maintain my balance and coordination, which was something I had been having trouble with on lithium, I temporarily went

on a quetiapine-only anti-psychotic medication regimen with my VA doctor's recognition.

When I got to jail, my priorities changed. (See *Petition p. 36-37*). I was no longer working hard in construction. The jail lifestyle is quite sedentary in comparison. What I needed was to be able to maintain my emotional balance and my lucidity in the hostile jail environment. That became my first priority, and for that I needed my medication. (See *Petition p. 27.*) I needed to be able to get and take my anti-psychotic medication right away. This was something that the court acknowledged had not happened, but no sua sponte habeas corpus directive proceeded from that recognition. At the time, I did not have the focus to recognize that such a proceeding was needed. All I knew was that I needed my anti-psychotic medication. I didn't care whether the jail psychiatrist put me on a quetiapine-only regimen, a lithium- only regimen or a lithium regimen augmented with quetiapine.

Nevertheless, no medication was provided for (22) days, and this runs contrary to the state regulations health care professionals are supposed to know and follow. I stopped receiving any residual benefit from the quetiapine I had been on prior to being jailed long before my lithium regimen was started back up by the jail psychiatrist.

This explains why my active lithium prescription did not have to be refilled in September 2004. With the two active quetiapine prescriptions I had, this also explains why I still had plenty of quetiapine at the end of October 2004 without having

that prescription refilled yet, either. But all of this is moot.

The state standard of care is to provide the psychiatric exam necessary to begin medication at intake, and not (22) days later. Whether the Pierce County Superior Court is a legitimate defendant or not, the court of appeals' refusal to dismiss them flags additional attention to this case.

§ 2. Correction Of An Incorrectly Reported Material Fact Discovered From the Pivotal Westlaw Citation To My Case

The citation 2007 WL 2116402 (W.D.Wash.) contains several of the district court's crucial errors in the reporting of fact that I wish to correct now. I was not reminded of these errors until I looked up the Westlaw references to my case so that I could provide the section entitled Opinions Below. This was a section that I had originally not provided. I initially didn't provide it because I didn't know what it was until I received additional guidance from the Clerk's Office.

The district court's decision in Docket 223 is what I'm appealing to the Supreme Court. This is the finding to be found at 2007 WL 2116402 (W.D.Wash.). It is dated 7/19/2007.

This citation also contains the cruxt of my complaint and petition to the Supreme Court. The pertinent section is found in Westlaw's reprint of the district court's *Discussion B. Pierce County pp. 6, 10.* Here I assert that county policies failed to meet the

state's regulated standards of care. The primary deficiency was the staffing level for jail psychiatrists. It was so deficient and so abysmally low that the jail failed to provide me with the required psychiatric exam at intake, and things snowballed from there. This is what caused me to go (22) days without my anti-psychotic medication. These claims are supported by the evidence I provided to the appellate court in *Appeal Dkts. 16, 27, 29, 30, 34, 36, 37, 38, 41, 50, 51, 54, 59, 60, 63, 67, 69, 70, 73 and 78.*[1] These comprehensive citations contain the 'specific' policies and practices that are shown to have caused my injuries.

The Westlaw citation goes on to incorrectly state that *"the record does not show the jail denying, delaying or interfering with treatment* ***once the jail was able to ascertain that treatment was in fact needed and currently prescribed,*** *" Westlaw Cit. p. 10.*

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[1] The list of the Supplemental Excerpts of Records (SERs) that I provided to the Appeals Court is found in *Pet. Appendix § 4 pp. 195-198.* All told the 9th Circuit Court of Appeals granted my motions to file (15) Supplemental Excerpts of Record totaling over 2,400 pages. See *Appeal Dkts. 16, 27, 29, 30, 34, 36, 37, 38, 41, 50, 51, 54, 59, 60, 63, 67, 69, 70, 73* and *78* covering a period from 4 Oct. 2007 to 21 Feb. 2009. This is an unbelievable length of time for an Appeals Court to accept new evidence if they didn't think there was something to the case that merited substantive review. Additionally, the Appeals Court ordered the defendants not to object to the filing of these supplements or else they would face sanctions. See *Appeal Dkt. 45* dated 12 March 2008. This is an extremely odd position for the appeals court to have taken if they expected to dismiss the case with nothing more than an unpublished memorandum, and so this serves to flag the case for additional scrutiny.

Here it can be seen that Westlaw is contradicting itself. This contradiction is necessary in order to fully assimilate the court's position. It took the jail (22) days for them to ***"ascertain that treatment was in fact needed and currently prescribed."*** This constitutes an unacceptable delay by any relevant professional mental health standards because it does not meet those standards and no effort was made to try to do so either. See *Pet. App. § 2 pp. 43-48.*

The health care professionals I saw for the first (21) days of my incarceration were limited to one general practice physicians assistant and one psychologist, neither of whom can perform psychiatric exams or prescribe psychotropic medication under Washington state law. These kinds of health care professionals are subordinate to psychiatrists and medical doctors. State regulations require that psychiatric exams and psychiatric prescriptions be provided by psychiatrists or medical doctors at intake, and not by their subordinates. Therefore, the jail's physicians assistant and the jail's psychologist were placed in situations where they were not properly licensed to take appropriate action. This was the cause of the delay, because one part-time jail psychiatrist simply cannot examine all the patients that need to be examined in an inmate population of 1,250.

The importance of requiring properly licensed professionals to be on staff to perform the duties that only they are licensed to perform to maintain state regulated standards of practice is highlighted by the following comparisons: 1. Would you want a bicycle

repairman to perform work on the aircraft engines of the airliners you fly in? Would his understanding and judgment be considered sufficient? 2. Would you accept having a certified nursing assistant perform your brain surgery instead of having it performed by a properly licensed neurosurgeon because the surgeon was unavailable? This, after all would still be considered care by a duly recognized health care professional that was provided without delay.

The answers to these questions are so obvious it begs the question as to why these same expectations regarding licensing standards aren't required in the jail setting as well. Clearly, accepting any of these propositions would be unreasonable. Thus, the deliberate indifference of these propositions is amply demonstrated by their unreasonableness.

§ 3. References for *Section § 5.2 Facts, Pages 6-13* from the *Petition for Writ of Certiorari*

These references were inadvertently left off the original petition. They were supposed to have been included with each numbered ***Fact*** in *Section § 5.2*, but somehow they got deleted from the final version and so here they are:

1. *D.C. Dkt. 186 pp. 7, 11-12.*
2. *Appeal E.R. III Dkt. 114 pp. 5, 9-10.*
3. *Id.*
4. *Id.*
5. *Id.*

6. *Appeal E.R. II Dkt. 188-2 pp. 1-2.*
7. *Id.*
8. *Id.*
9. *Appeal S.E.R. 15 Vol. II pp. 123-126.*
10. *Appeal E.R. I Dkt. 217 p. 2 ¶ 5.*
11. *Pet. Writ. Cert., Appendix § 2.*
12. *Id.*
13. *Appeal S.E.R 11., generally.*
14. *WAC 388-865-0500, RCW 71.05.050.*
15. *Appeal E.R. II Dkt. 188-2 pp. 2,4.*
16. *Id. pp. 1-4.*
17. *Appeal E.R. II Dkt. 188-1 pp. 16-20, 111, 113. Appeal E.R. II Dkt. 188-3 pp. 8-59.*
18. *E.R. II Dkt. 188-1 pp. 111, 113.*
19. *Appeal E.R. II Dkt. 188-2 pp. 1-9.*
20. *Loc. Cit. ¶¶ 17-19 above, Appeal E.R. II Dkt. 188-1 pp. 57-60, 92-104.*
21. *Id.*
22. *Id.*
23. *S.E.R 15 Vol. II pp. 123-126.*
24. *Pet. Writ. Cert., Appendix § 3.1.*
25. *Appeal E.R. II Dkt. 179-1 pp. 11-16.*
26. *Appeal Dkts. 41 and 51, generally.*
27. *Appeal Dkts. 41* and *51.*
28. *Pierce County v. State of Washington*, 144 Wash. App. 783, 185 P.3d 594; Thurston County Superior Court Case No. 03-2-00918-8 (10 Feb. 2006).

§ 4. Summary of Argument

My full argument is found in *Petition § 6*, and so I will simply summarize that argument here.

The failure to require compliance to the regulated standards of care under *RCW 10.77, RCW 71.05, RCW 72.23, WAC 388-865* and *RCW 74.09.555* for the mental health treatment of inmates allows for the violation of those same statutes, in addition to violating the *Equal Protection Clause* in *42 USC § 1983* and *Title II to the Americans with Disabilites Act*. See *App. § 2.2 pp. 43-48*.

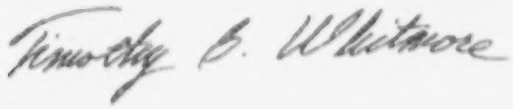
Suggesting that the proof of deliberate indifference requires more than the showing of a failure to comply with regulated standards of care destroys the purpose for having statutorily regulated standards of care.

§ 5. Conclusion

The petition for a writ of certiorari should be granted.

§ 6. Declarations

Under penalty of perjury, I certify that the facts I have presented are true and correct to the best of my knowledge and recollection.



/s/ Timothy B. Whitmore, former LT USCG
Alumni, U.S. Naval Academy

Dated: September 3, 2009

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Appendix 1

§ 1. Citations from Neuroscientists on Retainer at the Dept. of Justice:

Diana Fishbein, Ph.D. performed a study for the U.S. Department of Justice under Contract Award No. 2002-MU-BX-0013, Document No. 216303, in November 2006 entitled, *"Assessing the Role of Neuropsychological Functioning in Inmates' Treatment Response."* See ***Appeal Dkt. 14, E.R. II, Dkt. 179-1 pp. 17-72*** for the full text of that study.

My synopsis of that study is as follows:

Synopsis: Diana Fishbein is a neuroscientist who has published extensively on risk factors in mental health and behavioral disorders and underlying mechanisms in ability to respond favorably to treatment. She and her colleagues were awarded a grant from the Dept. of Justice in 2006 to complete a study that determined that most inmates do not receive necessary treatment and the few who do are unable to respond favorably due to underlying mental and physical deficits. They concluded that there are serious implications in failing to provide proper mental health care to inmates in jail. In common parlance, they proved once again that if you beat a dog it will make it meaner. At the same time, there are numerous reports that incarceration is related to increased severity of mental disorders and contributes to cognitive decline. Thus, neglect by the system for existing mental health disorders can lead to permanent injury, which is a travesty given that effective treatments are available. It was in this

context that these neuroscientists funded by DOJ discovered that failing to provide proper mental health care to inmates who need it has the same effect in lowering an inmate's overall empathetic response. Thus, their studies suggest that neglect, including neglect of mental health issues, exacerbates emotional and behavioral instability issues. The result is more often than not a deficiency in the ability to empathize, use good judgment and learn from experience and consequences. These researchers found that cognitive impairments are widespread and may directly interfere with the ability to respond to or engage in treatment. They also reported that cortisol response to stress, a measure of emotional regulation, was abnormal in inmates who did not respond favorably to treatment. Conventional treatments offered in prisons and jails are not well attended, provided to only a minority of the population, and are unable to remediate the mental and cognitive deficits often presented by inmates. Mental health interventions have the most value and are of the most benefit when they are initiated as early as possible and attention is given to underlying deficiencies.

Many of the inmates studied presented with impulse control disorders which preclude effective decision making and emotional regulation. This, in turn, precludes a favorable treatment response given the conventional approaches offered by prisons. Such inmates are more likely to make disadvantageous decisions; they are unable to consider all the possible outcomes of their actions compared to those who do

not suffer from impulse control disorders. This ability is physiologically-based and significantly influenced by a history of stress exposure. Stress interferes with the development and function of neural networks that are responsible for self regulatory behaviors and emotional states. In addition to cognitive deficits that result from this damage, cortisol release and other aspects of the emotional regulatory system may become impaired. These problems are encountered more often in inmates than in our society's general population given the extent to which they suffer from stress-related disorders (due to poverty, dysfunctional home environments, child maltreatment, head injury, etc.). In the absence of treatment, these impairments will worsen and are likely to manifest as conduct disorders.

These researchers concluded that inmates can be taught how to slow things down mentally so as to make better decisions, and that this can become a learned behavior. Even more importantly, there is evidence that these neural systems can be at least partially remediated with appropriate and effective treatment. Therefore, there is an opportunity for rehabilitation when the correctional environment is managed clinically. These cognitive and behavioral modification programs don't require much effort, but they do require that particular issues presented by inmates be addressed properly. In other words, although it might not be feasible to customize treatment for each inmate, it is possible to identify subgroups of inmates with similar problems who will

likely respond to particular approaches better than others. Thus, there is an opportunity for rehabilitation where traditional correctional punishments, meted out after the offending behavior has occurred, fail. However the rate of improvement becomes increasingly lower for subjects' that are forced to inhabit environments that are not conducive to improving their level of emotional and behavioral regulation. Allowing such deterioration to go uncorrected completely interferes with any desired rehabilitation process.

The researchers concluded that the deterioration of an inmates' mental health is directly associated with negative experiences, emotional neglect and mental mistreatment because these experiences alter cognitive functioning and cortisol responses to stress. This damage is both psychological and physiological. It is long lasting and can be permanent, especially under suboptimal conditions, if not attended to. Thus, this is a key area in correctional operations where the circle of cruelty and hate needs to be broken. This is not a *DeShaney* issue, either, because Standards of Care are Standards of Care.

Thus it can be seen that failing to provide proper mental health treatment to inmates who need it has serious consequences for society at large. It also has some very important constitutional ramifications that need to be resolved and corrected, but in reality *Tony Goodman ex Rel U.S. v. Georgia* and *Jett v. Penner* have already done that. Still, the *Equal Protection Clause* needs to be upheld. Like their

counterparts in mental hospitals, inmates with mental health problems need to receive proper, standardized treatment when they are in jail or in the custody of the state.

When I was an inmate, I did not receive mental health treatment that complied with the state's existing procedures that met existing standards of care, and it was done knowingly. That is my constitutional complaint. The scientific study by *Fishbein et al.* shows that there are serious liabilities to the inmate population, and consequently to the public at large, when treatment environments are not regulated and maintained properly. However, they go further than that by recommending emphatically that inmate behavior modification and control in our nation's correctional facilities needs to be managed clinically. This will go a long way to preventing further psychological and physiological damage to the inmate population's mental health. It would provide a positive treatment environment instead of a negative treatment environment, and it would create the opportunity to reduce the overall liability from crime in our society by taking advantage of the higher level of rehabilitation that cognitive behavioral treatment procedures provide. It is a moot point to consider whether or not the DOJ has formally adopted the recommendations from the *Fishbein et al.* study because the DOJ makes the *Fishbein et al.* study available for downloading to the public on their website, and the DOJ offers no competing studies that advocate continuing traditional correctional methods.

Appendix 6

The bottomline is that complying with the state's regulated standards of care for mental health treatment is a prerequisite for any DOJ sponsored cognitive behavioral treatment program to work.

Since 2006, the knowledge base concerning neuropsychological functioning in inmates' treatment response has been advanced by additional studies. Current information on this subject is reflected by a Jan. 2009 article entitled, *"Deficits in Behavioral Inhibition Predict Treatment Engagement in Prison Inmates."*[2] The additional studies reported in this article serve to provide additional validation to the conclusions that *Fishbein et al.* made in 2006.

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[2] Diana Fishbein, Monica Sheppard, Christopher Hyde, Robert Hubal, David Newlin, Ralph Serin, George Chrousos, Salvatore Alesci, "Deficits in Behavioral Inhibition Predict Treatment Engagement in Prison Inmates," Law Human Behavior DOI 10.1007/s10979-008-9163-7, American Psychology-Law Society-Division 41 of the American Psychological Association, Copyright 2009.

My Point of Contact for this study is Diana Fishbein, the co-author of the DOJ's previous study from 2006:

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Appendix 7

The updated article on, "*Deficits in Behavioral Inhibition Predict Treatment Engagement in Prison Inmates,*" is as follows:

Law Hum Behav
DOI 10.1007/s10979-008-9163-7

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Deficits in Behavioral Inhibition Predict Treatment Engagement in Prison Inmates[3]

Diana Fishbein · Monica Sheppard · Christopher Hyde · Robert Hubal · David Newlin · Ralph Serin · George Chrousos · Salvatore Alesci[4]

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[3] Reprinted with permission.

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Appendix 8

Abstract: Many inmates do not respond favorably to standard treatments routinely offered in prison. Executive cognitive functioning and emotional regulation may play a key role in treatment responsivity. During intake into treatment, inmates (N = 224) were evaluated for executive functioning, emotional perception, stress reactivity (salivary cortisol), IQ, psychological and behavioral traits, prior drug use, child and family background, and criminal histories and institutional behavior. Outcome measures included program completion, treatment readiness, responsivity and gain, and the Novaco Reaction to Provocation Questionnaire. Relative deficits in behavioral inhibition significantly predicted treatment outcomes, more so than background, psychological, or behavioral variables, and other neurocognitive and emotional regulatory measures. Future replications of these results have potential to improve assessment and treatment of offenders who are otherwise intractable.

Identification of underlying mechanisms in differential responses to treatment for dysregulated behaviors is critical for more effective tailoring of intervention approaches to specific needs of distinctive inmate subgroups (Andrews & Bonta, 2006). Although resources are too scarce to fully match treatments to individuals, at a minimum, the ability to identify characteristics and conditions that compromise treatment responsivity is necessary for

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the development of interventions that more intensively and effectively target existing deficits. A first step toward a better understanding of mechanisms underlying correctional treatment effects is the elucidation of factors that predict the ability of inmates to engage, persist, and show attitudinal and behavioral improvement in response to existing programs.

Evidence is mounting to suggest that integrity of particular executive cognitive functions (e.g., disinhibition, risky decision making, inattention) and emotional regulation (e.g., facial recognition, emotional responses to threat stimuli, psychophysiological stress responses) may represent neural processes underlying variability in responses to treatment programming for behavioral disorders (e.g., Fishbein et al., 2006; Nixon, Paul, & Phillips, 1998). A few existing studies have identified deficits in these functions that, for example, specifically predict response to treatment for drug abuse (Aharonovich, Nunes, & Hasin, 2003; Bauer, 2001; Forman et al., 2004). Findings provide potentially important clues in the search for conditions that may interfere with intervention efficacy for types of psychopathology that involve high risk behaviors. Intact executive functions and emotional regulation may, in fact, be a prerequisite for processing and executing curriculum materials from any treatment program that invokes higher order cognitive abilities, such as cognitive-behavioral therapies, which are commonly employed in correctional settings. Participants with these skill deficiencies may not be as likely to benefit from programs that do not first

address them. Because executive function impairments are malleable (Hermann & Parente, 1996; Manchester, Hodgkinson, & Casey, 1997; Riggs, Greenberg, Kusche, & Pentz, 2006; Rothwell, La Vigna, & Willis, 1999), there is potential for affected individuals to respond favorably to treatment approaches that are specifically targeted to existing deficits (Fals-Stewart, 1993; Grohman & Fals-Stewart, 2004).

Neurocognitive and Emotional Dysfunction and Dysregulated Behavior

Impairments in regulation of executive functions and emotional stress responses have been implicated in the development of dysregulated behaviors such as conduct disorder, heightened aggression, rule-breaking, and drug abuse (Deckel, Hesselbrock, & Bauer, 1995; Fishbein, 2000; Giancola, Martin, Tarter, Pelham, & Moss, 1996; Giancola, Mezzich, & Tarter, 1998; Moffitt, Lyman, & Silva, 1994; Seguin, Pihl, Harden, & Tremblay, 1995; Tarter, Mezzich, Hsieh, & Parks, 1995). Aspects of executive functioning that are relevant to an understanding of dysregulated behaviors include behavioral disinhibition, poor decision-making ability, relative insensitivity to negative outcomes, cognitive inflexibility, impaired problem solving and planning, and emotion misattributions (Mirsky & Siegel, 1994). Aberrant physiological responses to stress (e.g., cortisol release) are also implicated given that their regulation is integral to the establishment and integrity of executive function components

(Raine, Lencz, Bihrle, La-Casse, & Colletti, 2000); a neural network supports a feedback loop in which cognitive demands modify stress responses that, in turn, modify cognitive processing and resultant behaviors (Elliott, Friston, & Dolan, 2000; Liberzon et al., 2000; Steinberg, 2005). Dysfunction of these cognitive and affective domains potentially explains the impulsivity, emotional instability, unresponsiveness to threats of punishment, rules and laws, and negative consequences, as well as an excessive need for stimulation and reward often observed in offender and inmate populations (Dawes et al., 2000; Raine, 1993; Reiss, Miczek, & Roth, 1994; Rogers & Robbins, 2001). The possibility that these behavioral tendencies may further interfere with the ability to respond to treatment makes conceptual sense. Brain systems that support development and function of these neurocognitive and emotional regulatory functions are profoundly influenced by experiences of severe and/or chronic stress (Beers & De Bellis, 2002; Bremner, 1999; De Bellis, Keshavan, Spencer, & Hall, 2000; Steckler & Holsboer, 1999). The pattern and efficacy of an individual's responses to stress have been related to the propensity for high risk behaviors (De Bellis, 2002; Giaconia et al., 2000; Kreek, Schlussman, Bart, Laforge, & Butelman, 2004; Nemeroff, 2004). Thus, it is relevant that offender populations have a particularly high prevalence of adversity relative to the general population (Fishbein, 2000; Martell, 1992; Volavka, Martell, & Convit, 1992) and that aberrant stress responses (e.g., low cortisol responsivity) often characterize aggression,

psychopathy, and impulsivity (Moss, Vanyukov, Yao, & Kirillova, 1999; Oosterlaan, Geurts, Knol,&Sergeant, 2005; Taylor, Carlson, Iacono, Lykken,& McGue, 1999). Such deficits are considered to reflect an underarousal of emotional systems that regulate abilities to process, interpret, and react to social cues (Walker et al., 1991), potentially impeding the ability to respond favorably to interventions that do not address such impairments.

Neurocognitive and Emotional Dysfunction and Treatment Engagement

Damage to structures that constitute the neural circuitry for cognitive-emotive processes (e.g., by stress or adversity [Davidson, 1994; De Haan, Luciana, Malone, Matheny, & Richards, 1994]), can impair regulatory operations during aversive conditioning, reward-related feedback, and riskrelated decision making (see Critchley, Elliot, Mathias, & Dolan, 2000). Theoretically and to some extent empirically, these functional impairments interfere with abilities to integrate new information provided by standard treatment programs and execute the necessary behavioral changes via shifting behavioral strategies based on new information, and/or inhibiting affective responses that promote maladaptive behaviors. This scenario may be especially true for Cognitive Behavioral Therapy-based treatment approaches which form the basis for many standard correctional treatments and reflect Evidence-Based Practice (Serin, 2005). Processing of curriculum materials from Cognitive

Behavior Therapy relies on the ability of participants to (a) be cognizant of and responsive to potential negative consequences of their behavior, (b) inhibit inappropriate behavioral responses, and (c) understand and act on the benefits of deliberate and cautious decision making (Blume, Davis, & Schmaling, 1999; Blume, Marlatt, & Schmaling, 2000). Although Cognitive Behavioral Therapy is generally considered to be the most effective approach available to reducing behavioral problems in this population (e.g., Holbrook, 1997; Nicholaichuk, Gordon, Gu, & Wong, 2000), there is considerable variation in treatment response; a significant subgroup does not respond favorably as indicated by high recidivism and relapse rates, as well as poor attendance, compliance, and retention. Preliminary studies suggest that poor neurocognitive and emotional regulatory function may at least partially explain this variability.

The Current Study

Additional studies are needed to identify neurocognitive and emotional regulatory characteristics that may predict or underlie treatment engagement in prison inmates other than basic background factors which are usually not malleable. To fill this important gap, this study sought to determine whether deficits in executive functions and emotion perception and regulation compromised the ability of inmates to engage, persist, and show attitudinal and behavioral improvement in response to a standard Cognitive

Behavior Therapy-based correctional therapy. We hypothesized that poor treatment engagement, responsivity, and completion, and related behaviors (e.g., aggression) would be predicted by relative deficits in the ability to effectively process and apply curriculum materials reflected by aberrant processing of neurocognitive and affective stimuli, and attenuated cortisol responses at baseline.

METHOD

Participants

Three medium/maximum custodial level facilities in the State of Maryland's Department of Public Safety and Correctional Services (DPSCS) were selected to participate in this study on the basis of programmatic similarities to ensure continuity and uniformity of treatment duration, type and modality of the program, treatment providers, and other environmental factors. A total of 224 male inmates were recruited over a 2.5-year period from a pool who volunteered for the treatment "Thinking for a Change," as part of the "treatment-as-usual" (TAU) procedure in the state prisons. This protocol was approved by both the RTI Institutional Review Board and the State of Maryland. There was no comparison group given the primary hypothesis that variability in engagement relative to a standard treatment approach would be predicted by neurocognitive and emotional regulatory functioning. Inmates who volunteered were first asked to complete an IQ test (Multidimensional Aptitude

Battery); 27 inmates with an IQ below 75 were excluded. Inmates with records indicating that they had mental retardation, dementia, amnesia, and delirium or who were illiterate were not referred to the study investigators by the facilities due to their inability to understand consent and interference by these conditions on their performance. Inmates who met eligibility criteria for study participation were recruited through identification numbers provided by the facility to include only those between 21 and 49 years old with a minimum of 18 months remaining on their sentence to avoid the stress of pre-release preparations and potential transfers. Participants reflected the ethnic diversity of the offender population in the state system. Those eligible were scheduled for testing and signed the full consent form.

Treatment Program Participation

After baseline assessments, inmates began their participation in the facilities' Cognitive Behavioral Therapy-based program. Cognitive Behavioral Therapy is the most widespread treatment approach used in U.S. correctional institutions to reduce violence, drug abuse, sexual offending, and other behavioral disorders common in inmates (Holbrook, 1997; Nicholaichuk et al., 2000). Cognitive Behavioral Therapy is designed to help inmates develop impulse control, manage anger, and learn new behavioral responses to real-life situations. The underlying assumption is that learning processes play an important role in the

development and continuation of antisocial behavior and can be used to help individuals enhance their ability to exert self-control. Cognitive Behavioral Therapy is designed to help patients recognize situations in which they are likely to become agitated or aggressive, avoid these situations when appropriate, and cope more effectively with a range of problems and behaviors associated with aggression.

In the three participating facilities, the DPSCS offers a series of three treatment phases that meet for 90 min twice a week, totaling 50 sessions. The first phase, consisting of 20 sessions delivered by social workers, is called "entry point" and involves curricula on "Thinking, Deciding, Changing." Entry point blends a decision making and cognitive restructuring modality (a self-reflective process to search for triggers of misconduct) into a cognitivebehavioral modality (an external, skill-building process) for self change. Although participation is voluntary, the focus is on inmates who are considered "high risk", including those with multiple incarcerations, history of violence, poor institutional adjustment, and impulsive behavior. The present study focused on performance and retention during this first session only given routinely high drop-out rates. The sole system requirements for retention in the program are that inmates do nothing to undermine the group process and remain free of serious infractions. Immediately after inmates completed the first phase, treatment performance was evaluated by staff on the inmate using treatment readiness and gain and responsivity

scales, program completion, and aggressive reactions to provocation.

Procedures

Consenting inmates underwent baseline testing for several complementary dimensions of neurocognition and emotional regulation and conditions that putatively influence their development. Background and psychological instruments were used to characterize inmates with respect to clinically relevant traits (e.g., drug abuse, impulsivity, aggression, and psychopathy). As measures of engagement and responsivity, social workers provided evaluations and inmates provided self reports. Background, psychological, and neurocognitive and emotional regulation measures were assembled into an assessment battery to determine which variable set best predicted treatment engagement indicators.

Measures

General Intellectual Functioning

The Multidimensional Aptitude Battery (MAB; Sigma Assessment Systems, 1999) was self-administered to identify general intellectual deficits that may have resulted from head injury or other causes and to isolate the predictive value of executive functioning to treatment engagement assuming the hierarchical nature of complex functions (Zelazo, Carter, Reznick, & Frye, 1997). When these more

basic functions are impaired, integrity of executive functions can be expected to suffer as well. Test–retest reliabilities on separately timed test administrations obtained values for total scores of .95 for Verbal, .96 for Performance, and .97 for the Full Scale.

Behavioral and Psychological Questionnaires

A condensed version of the widely used Addiction Severity Index (ASI) (McLellan et al., 1992) was used to assess nature and extent of prior drug use, background factors such as socioeconomic status (Hollingshead rating), religious preference, race/ethnicity, family history of drug use, alcoholism, and mental illness, head injuries, child abuse, medical and psychological status, and other demographic factors. The Self Report Psychopathy Checklist (Hare, 1991; Hart, Lahey, Loeber, Applegate, & Frick, 1995; Levenson, Kiehl, & Fitzpatrick, 1995) is a self-report version of the Psychopathy Checklist-Revised (PCL-R) showing high correlation with the original test and good reliability (Hart et al., 1995). This instrument generates a Primary (e.g., tendency to lie, manipulativeness, and lack of remorse) and Secondary (e.g., impulsivity, quick-temperedness, and lack of long-term goals) psychopathy score. Also, the Reactive-Proactive Aggression Questionnaire (Raine et al., 2006) provided an assessment of predatory (proactive) and impulsive (reactive) aggressive inmates. Confirmatory factor analyses indicated that the two-factor structure produced a

very good fit and item-total correlations ranged from .41 to .57 for the proactive scale, .45–.58 for the reactive scale, and .41–.60 for the total scale. All the three scales have internal reliabilities in excess of 0.83 (see Raine et al., 2006). The Early Trauma Inventory, shown to have acceptable validity and internal consistency (Bremner, Bolus, & Mayer, 2007; Bremner, Vermetten, & Mazure, 2000), was also used as a global indicator of incidences of trauma, witnessing violence, and child abuse and neglect, as well as a subscale measuring symptoms of PTSD.

Executive Cognitive Function Tasks

Knowledge regarding the functional neuroanatomy of cognitive task performance has potential implications for understanding the pathophysiology of behavioral dysregulation and provides a mechanistic account of how interventions mediate their effects (Bremner, 2003; Charney & Deutch, 1996). Thus, the tasks selected for this study have been neuroimaged (either PET or fMRI) to provide information on what areas of the brain are recruited during performance. Importantly, only dimensions of executive functioning that have been associated with behavioral dysregulation and that are conceptually related to treatment responsivity were used; additional tasks would have been informative, however there were severe time constraints for testing given the prison environment. Neurocognitive and emotional perception tasks were computerized and nonintrusive. Inmates were tested individually

at a time that did not interfere with meals, lock-downs, or counts. Questionnaires and neurocognitive tasks (see Table 1) were administered in the mornings (tasks were administered first to avoid the effects of fatigue on cognitive functioning) and the stress task was conducted in the afternoon.

The Cambridge Decision Making Task (CDMT: Rogers et al., 1999a, 1999b) was developed to dissect the cognitive components involved in decision making and measures willingness to take risks and relative sensitivity to rewards versus penalties. It has been found to have sensitivity and specificity in high-risk populations (see Fishbein et al., 2005b for a complete description) and reliably activates a portion of the PFC and the anterior cingulate involved in social skills, impulse control, and sensitivity to rewards (Fishbein et al., 2005a). In this task, larger rewards are always associated with the least likely outcome, thus capturing the conflict inherent in risk-taking situations. A tendency to take more risks in all conditions in pursuit of a large reward and with a willingness to tolerate an even higher probability of a large loss was expected to predict a lack of positive behavioral change in response to the experimental intervention. Performance measures generated by this task included in our model were percentage of the riskiest decisions and mean reaction time for riskiest decision. Two outliers were discovered for mean reaction time on this task (skewness = 3.5). With their removal, skewness was significantly reduced (skewness = 1.1) and the distribution became more normalized; thus, analyses including this variable excluded these two subjects.

Appendix 21

Table 1: Test battery

	Measurement instruments.
Predictor variables	
Executive cognitive performance	Cambridge Decision Making Task, Logan Stop-Change Task, Stroop Color-Word Interference Task
Emotion perception Emotional regulation	Facial Recognition Task Speech Task with Cortisol Sampling SCL-90
Potential moderator variables	
General intellectual functioning	Multidimensional Aptitude Battery
Demographics, drug and alcohol use, family history, etc.	Background Inventory (adapted from the ASI)
Psychopathy traits	Self Report Psychopathy Checklist
Aggression type	The Reactive-Proactive Questionnaire
Past failures/successes	Success Inventory
Events that could alter treatment response	Events Checklist
Lifetime stress exposures	Early Trauma Inventory
Outcome variables	
Change in behavioral control	Novaco: Reactions to Provocation
Institutional behaviors	OBSCIS Data on Good

Appendix 22

	Conduct Points
Treatment response/ progress	Responsivity and Gain Scales from Social Workers
Treatment completion	Completion of first session

SCL-90 Symptom Checklist-90,
ASI Addiction Severity Index,
OBSCIS Offender Based State Correctional Information System

The Stop-Change Task (SCT) measures impulsivity and response shifting (Logan & Burkell, 1986 and see Fishbein et al., 2006 for full description) and has been shown to activate the right hemispheric anterior cingulate cortex, supplementary motor area, and inferior prefrontal and parietal cortices, which modulate error monitoring, interference control, and task management (Rubia et al., 2001). This task requires deep concentration, impulse control, timing, and the ability to shift responses in light of newly presented information (a novel stimulus). Measures from this task include percentage correct and reaction time (RT) for all the trials that included presentation of a new stimulus.

The *Stroop Interference Task* uses previously learned information to assess the three attributes of executive frontal lobe function: complexity, a "nonroutine" nature, and the novel use of old information. Patients with frontal lobe damage are typically influenced by stereotypical thinking, which would interfere with the ability to produce the atypical responses required on the Stroop (Luria,

1980; Mesulam, 1986), and often experience difficulty with mental flexibility (Stuss & Benson, 1986). Studies suggest that the anterior cingulate (believed to be involved in aggression) is primarily recruited for performance on the Stroop (Bench et al., 1993; Pardo, Pardo, Janer, & Raichle, 1990). The primary score generated by the Stroop is the "interference score," calculated by multiplying the first two conditions (W = word score and C = color score) and dividing that product by the sum of those conditions to produce a "CW prime" score (W 9 C/W ? C = CW0). CW0 is then subtracted from the sum of third condition (CW) score (CW - CW0 = interference).

Emotion Perception

Research suggests that emotion-processing deficits lead to a distorted perception of social cues that has been associated with aggressive and disruptive behaviors (Crick & Dodge, 1996; Dodge, 1980). PFC impairment reduces inhibition of emotional behaviors that may be generated from these distorted perceptions; thus, measurement of emotion perception is critical. A Facial Expressions of Emotion: Stimuli and Test (FEEST: Ekman & Friesen, 1975) involving a facial recognition technique was used due to its high level of validity and reliability. Emotion attribution has been directly related to the function of the amygdala (McClure et al., 2004; Whalen et al., 2001; Williams et al., 2004; Yang, Menon, Reid, Gotlib, & Reiss, 2003) and is shown to be impaired in individuals with externalizing disorders, such as ADHD, psychopathy,

and drug abuse (Blair, Colledge, Murray, & Mitchell, 2001; Kornreich et al., 2003; Kossen, Suchy, Mayer, & Libby, 2002). This task requires that subjects identify one of six emotions (happiness, sadness, surprise, fear, disgust, and anger) that best describe the faces (10 for each expression). The scores produced included the number of errors in attributions of each emotional expression and total correct responses.

Emotional Regulation and Stress

The significant effect of public speaking on emotional and physiological stress responses has been well demonstrated (see Rohrmann, Hennig, & Netter, 1999). Inmates were instructed to make a 10-min persuasive speech providing justification to a parole board for an early release which was ostensibly judged by the research assistant according to how compelling and effective it was, and in terms of its formal aspects and content. Salivary cortisol levels, which correlate well with free serum cortisol levels, were measured during the treatment baseline to assess inmates' stress response to emotional stimuli (Yao, Moss, & Kirillova, 1998). The task was administered in the afternoon when cortisol is most stable. Two resting state samples of saliva (2 ml) were collected after an acclimation period and immediately before the speech. Two additional samples were taken 20 min after the speech, representing the peak cortisol response. Cortisol tends to rise about 20 min after a stressor and then falls precipitously, thus we were able to evaluate the

ascending curve to assess the relationship between treatment engagement and extent of effective elevation in cortisol.[5]

In order to evaluate the inmates' present emotional and psychological state which may influence stress responses, the Symptom Checklist-90 (SCL-90) was administered immediately before this task (Derogatis, Rickels, & Rock, 1976). The Global Severity Index from the SCL-90 was used as a covariate in analyses of cortisol data.

Treatment Performance Indicators

Behavioral performance measures, questionnaires, official records, and evaluations from social workers were used (Table 1). Treatment readiness and gain and responsivity were evaluated by Social Workers using an instrument designed to assess Cognitive Behavioral Therapy preparedness and performance (Kennedy & Serin, 1997, 1999; Serin, 1998; Serin, Mailloux, & Kennedy, 2007). Each of these three domains is represented by a description and a 4-point rating scale with behavioral examples for each subscale. A Treatment Readiness clinical rating was adapted for use as a

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[5] The saliva samples were stored at -20oC until processing. They were then centrifuged to remove particulate matter and extracted with hexane: ethyl acetate. Aliquots of the extract were evaporated to dryness in a rotary evaporator. The dried extract was redissolved in buffer and the cortisol content was determined using a highly sensitive RIA procedure with, 125I-radiolabeled cortisol. Sensitivity of the method is 0.05 mg/dl using 0.2 ml of saliva (Esoterix Inc., Austin,

self report measure (see Casey, Day, Howells, & Ward, in press; Day et al., 2008; Serin et al., 2007) and has shown acceptable intraclass correlations (Y. Lee, unpublished data; L. Marshall, unpublished data). Subscales of this rating include: problem identification, macro treatment benefits, micro treatment benefits, treatment distress, treatment goals, treatment behaviors, behavioral congruency, and treatment support. Subscales were combined to produce a total readiness score for this performance domain (Cronbach's a = .73 in the present study, and .83 in Serin et al., 2007). This instrument was administered at baseline, prior to neurocognitive assessments and treatment participation. Although this measure is technically not an outcome measure, it was included in a separate regression model to determine whether neurocognitive, emotional regulation, and background measures predicted the extent to which inmates perceived themselves to be ready for treatment.

Treatment indicators were further evaluated by social workers using a combination of the Treatment Responsivity and Gain Scales immediately after the first treatment phase. The Responsivity subscales reflect personality dimensions putatively related to treatment performance and include Callousness, Denial, Procrastination, Intimidation, Power and Control, Rigidity, Victim Stance and Procriminal Views (Cronbach's a = .85). The Gain subscales reflect program participation and performance, such as Evidence of Increased Skills from Program, Disclosure in Program, Application of Knowledge,

Application of Skills, Depth of Emotional Understanding of Program Content, Appropriateness of Behavior in Group, Participation, and Therapeutic Alliance (Cronbach's a = .90). Items within each scale, in a 4-point Likert scale format (i.e., 0–3), were completed by social workers based on their observations of inmates participating in their treatment groups and in the research protocol. Social workers were instructed to consider change in behavior, skills, attitude from commencement to present evaluation in their responses. Descriptions were provided of each subscale; e.g., Evidence of Increased Skills From Program subscale: "This item considers the development of specific skills the treatment program is intended to impart. A higher score indicates the inmate has exhibited the increased ability to do more than simply repeat in group that which has been demonstrated in previous group sessions."

The Novaco Reaction to Provocation inventory (Novaco, 1994) was given at baseline and again after completion of each treatment phase. There are two parts, the first set of subscales assessing cognitive, arousal, and behavioral domains and the second assessing impulsive reaction, verbal aggression, physical confrontation, and indirect expression. This instrument is sensitive to behavioral change particularly in response to an intervention. Noncompletion of the program due to disinterest, commission of an infraction and/or time in segregation, disruption to the group, lack of cooperation, or a related 'negative' reason was considered a poor treatment outcome.

Noncompletion due to a 'neutral' cause such as obtaining a job, mandatory transfer, or other reason unrelated to noncompliance was excluded in analyses; their reasons for noncompletion were considered "neutral" and not indicative of a good or bad outcome. Inmates who dropped out of treatment were retained in the study and in all possible cases were tested according to the same schedule as those who remained in treatment. Also, only those who remained in treatment for at least two weeks were included in the analyses; treatment engagement and responsivity cannot be measured in inmates who discontinued early as exposure would be insufficient to obtain self evaluations and social workers would not have sufficient familiarity with the inmates to provide an evaluation.

Results

Statistical Techniques

Primary analyses were restricted to performance during and immediately after the first treatment phase due to the large numbers who did not progress beyond that stage in treatment (see Table 2). Extraordinarily high attrition rates are common in prison treatment programs (Hiller, Knight, & Simpson, 1999); thus, one focus of this study was to determine whether neurocognitive and emotional regulation factors predicted attrition. Also note that sample sizes differ for various analyses given missing data. In all the analyses, $p<0.05$ was considered significant.

Appendix 29

A score (t2 - t1) reflecting change from baseline to the time period after the first treatment phase (whether or not participants completed) was calculated for the total score on the Reaction to Provocation measure as another outcome potentially related to treatment participation. A linear regression analysis was conducted with change scores as the dependent variable and background and cognitive measures as predictor variables.

Two salivary cortisol samples were obtained prior and subsequent to stress task administration during the treatment baseline; each subset of two samples was averaged to generate a baseline and posttest value. In cases where only one sample was viable, no averaging was conducted. Standardized values (z-scores) were calculated for baseline and posttest cortisol levels and relative change from baseline was computed by subtracting baseline from posttest z-scores. Analyses including cortisol measures were adjusted for Body Mass Index (BMI) given the inverse

Table 2 Sample descriptives

	N	Min	Max	Mean	StdDev
Age of inmate	224	21	49	31.08	5.76
Verbal IQ	224	70	117	88.04	11.49
Performance IQ	224	70	136	90.46	15.11
Full scale IQ	224	70	122	88.50	12.37

Appendix 30

Months in prison	221	1	251	38.67	40.53
Years of education	224	4	21	11.39	1.69
Weight (lbs)	220	135	360	202.37	36.94
Height (inches)	220	60	83	67.26	3.08
Treatment for alcohol abuse	225	0	20	.77	2.11
Treatment for drug abuse	225	0	24	1.36	3.14
PCL-primary psychopathy	222	12	54	32.29	8.60
PCL-secondary psychopathy	222	9	37	23.17	5.58
Proactive aggression	225	0	24	6.29	4.76
Reactive aggression	225	0	24	11.16	4.58
SCL-GSI	195	34	81	59.99	12.56

PCL Psychopathy CheckList,
SCL-GSI Symptom Checklist-90 Global Severity Index

relationship between abdominal obesity (as measured by BMI) and HPA Axis function (Rosmond, Dallman, & Bjo¨rntorp, 1998). BMI was calculated by dividing weight (kg) by height (meters squared). Also, since correlations between SCL-90 scores and cortisol levels were nonsignificant, cortisol change

scores were used in regression models that only included adjustments for BMI.

A hierarchical multiple regression ("sequential regression" statistical model) was conducted to attempt to delineate which of the neurocognitive and emotional regulation variables best predicted each treatment outcome (dependent variable). This hierarchical approach to multiple regression allows determination of whether the final predictor—the neurocognitive or emotional regulation measure—entered into the regression equation can explain a significant proportion of the variance in the dependent variable over and above that of which is attributable to earlier data sets. It thus represents a conservative test of the effect of the variable(s) of interest in that variables first entered are maximized. For all models, background covariates included age, IQ, and education. Additional covariates were included in the secondary set of predictors based on a significant correlation with either treatment outcomes or neurocognitive and emotional regulation measures; thus, for all models, covariates included the primary psychopathy measure, reactive aggression, the global severity score from the SCL-90, family history of alcoholism, and average amount of previous drug usage. For Treatment Gain and Treatment Responsivity, and Reaction to Provocation outcomes, a history of physical abuse was added. Also for Reaction to Provocation, a history of emotional abuse was added based on their correlation, and the reactive and proactive aggression measures were excluded given their conceptual and empirical overlap with this

outcome. An R2 change, an F change, degrees of freedom (df), and the t statistic are reported to explain how much each individual predictor (i.e., neurocognitive or emotional regulation measure) contributed to the variation in the dependent variable controlling for both the first (background) and second (psychological and behavioral) sets of variables. And covariates that were significantly related to each outcome in the final models are included.

Treatment completion was coded as 0 or 1, reflecting completion or discontinuation of the first phase. Each treatment outcome was modeled as a linear function of each neurocognitive and emotional regulation measure and covariate factors using logistic regression methods. Covariates included in models were those that were significantly related to either neurocognitive/emotional regulation measures or outcomes and were entered in a stepwise fashion. Age, education, and IQ were entered into the model first, and history of physical abuse and psychological problems in the past 30 days were entered second. Omnibus tests were conducted of the net effect of each neurocognitive and emotional regulation variable separately on treatment outcomes after adjustment for covariates. Thus, v2, degrees of freedom, Cox & Snell R2 (which provides a test of strength of the association and not percentage of variance explained in a logistic regression model) are reported for the third block of each model. Also, those covariates that were significantly related to each outcome in each model are shown.

Appendix 33

Preliminary Analyses

Table 2 presents a description of the combined population including inmates from the three prison facilities combined. In total, 17.7% were Caucasian, 73.7% were African American, and 5.6% fell into other ethnic/racial categories. Approximately 44% reported having had depression, 38% anxiety, 44% violent behavior, and 13% had suicide attempts in their lifetimes. Data gleaned from official records (OBSCIS) indicated that 3% committed primarily property offenses, 32% were primarily drug offenders, and 65% had violent offense records. The following percentages reflect a history of psychopathology among immediate family members: alcoholism = 46.4%; drug abuse = 52.2%; and mental illness = 22.8%. A total of 28.3% (n = 71) reported severe head injury ([3 min unconsciousness). A preliminary analysis was conducted to determine whether history of head injury predicted treatment response; those with head injury had less treatment gain ($p<0.05$) than those without head injury. The only neurocognitive or emotional regulatory dimension related to head injury was inhibition/response shifting and for all central neurocognitive and emotional regulation variables, their contributions to treatment gain appeared to be independent; interaction effects between head injury and each neurocognitive and emotional regulation domain on treatment outcomes were insignificant. On the other hand, those with head injuries had more psychological problems in the last 30 days, a greater history of physical, emotional, and sexual

abuse, and higher levels of both proactive and reaction aggression.

Correlation analyses were conducted between predictor variables. Results suggest a relatively low level of multicollinearity: the Stroop Interference Score and cortisol levels ($R = .211$, $p<0.05$), reaction time on the CDMT ($R = -.22$, $p<0.01$), and percentage correct on the SCT ($R = .26$, $p<0.005$). The percentage correct on the SCT was also related to the total score on the FEEST ($R = .19$, $p<0.05$) and the CDMT reaction time ($R = -.16$, $p<0.05$). Reaction time on the SCT and percentage of safe choices on the CDMT were not significantly related to any other independent measure.

Correlations were also computed to assess relationships among treatment outcome variables (with the exception of the dichotomous variable treatment completion). For most measures, outcomes were unrelated to one another, suggesting that they are likely measuring different treatment dimensions (results not shown) and providing justification for including them as separate constructs. Thus, these instruments are likely measuring different treatment outcome dimensions. Due to strong convergence, however, between scores on the Treatment Responsivity and Gain subscales ($R = .965$, $p<0.001$), responses were combined to produce a total responsivity and gain score for these performance domains. Cronbach's a for this combined construct was .92, suggesting high internal validity.

A final preliminary analysis assessed correlations between each treatment outcome and background, behavioral, and psychological variables.

Unexpectedly, very few significant relationships emerged between background, behavioral and psychological characteristics, and treatment outcomes. There were no variables significantly related to Treatment Readiness. Those inmates with greater Treatment Responsivity and Treatment Gain reported less physical abuse: $R = -.17$, $p<0.05$ and $R = -.14$, $p<0.05$, respectively. Reaction to Provocation Change scores were related to history of physical abuse ($R = -.30$, $p<.0001$), history of emotional abuse ($R = -31$, $p<.0001$), proactive aggression ($R = -.35$, $p<0.0001$), and reactive aggression ($R = -.35$, $p<0.0001$). And in an ANOVA analysis, program completers reported a lesser history of physical abuse ($F = 8.89$, $p = 0.003$) and experiencing psychological problems a fewer number of days in the last month ($F = 6.19$, $p = 0.01$). As stated above, background, psychological, and behavioral variables that were significantly related to each outcome or neurocognitive/emotional regulation measure were included as covariates in the models described below; e.g., childhood physical abuse was included as a covariate in models with Reaction to Provocation Scores.

Neurocognitive and Emotional Regulatory Predictors of Treatment Responses/Outcomes

Treatment Readiness

Higher levels of self-reported treatment readiness were associated with fewer correct ($t = -2.64$, $p<0.05$) and shorter reaction times ($t = -2.02$,

$p<0.05$) in response to delay tone trials on the impulsivity task. Also, reaction times in response to risky decisions on the CDMT were shorter in those who perceived greater treatment readiness ($t = -2.58$; $p<0.01$). Change in cortisol during the stress task was more pronounced in those who viewed themselves as more treatment ready relative to those who reported less readiness ($t = 2.03$; $p<0.05$) (see Table 3).

Treatment Gain and Responsivity

Treatment Gain and Responsivity scores were strongly and positively related to percent correct ($t = 4.44$, $p = 0.0001$) and reaction times ($t = 3.59$, $p<0.0001$) on the SCT. RT during risky decision making on the CDMT was also predictive of Responsivity ($t = 1.83$, $p<0.05$) (Table 4).

Treatment Completion

Inmates who completed the first treatment phase, and excluding those who began treatment but dropped out for reasons unrelated to treatment engagement or progress (e.g., transfer, work, etc.), exhibited less impulsivity with a greater percentage of correct responses on the SCT ($v2 = 4.61$, $p<0.05$) and longer RTs ($v2 = 3.43$, $p<0.05$) than noncompleters. They also showed lengthier reaction times in response to risky trials on the CDMT ($F = 14.98$, $p<0.05$) (see Table 5).

Table 3 Hierarchical regression analyses demonstrating contribution of neurocognitive measures to variance in Treatment Readiness

Neurocognitive Measure	R^2 change	F change	N (df)	t
SCT: total % correct	.04	6.96**	166 (1,156)	-2.64
SCT: average RT	.02	4.68*	166 (1,156)	-2.02
CDMT: percent safe trials	.01	0.91	177 (1,167)	.95
CDMT: RT to risky trials	.04	6.64**	175 (1,165)	-2.58
Stroop: interference score	.00	0.04	139 (1,129)	-.20
FEEST: total correct	.01	1.16	177 (1,167)	1.08
Cortisol:. change score	.04	4.12*	107 (1,97)	2.03

The Sig. Covariate for all measurements is not applicable with the exception of 'Cortisol: change score,' which has a sig. covariate noted as 'education.'

SCT Stop Change Task, CDMT Cambridge Decision Making Task, FEEST Facial Expressions of Emotion: Stimuli and Test, RT Reaction Time
* $p<0.05$, ** $p<0.01$

Model 1: IQ, age of inmate, years of education

Model 2: IQ, age of inmate, years of education, PCL-prim, SCL-GSI, reactive aggression, average amount of use of all drugs, family history of alcoholism

Model 3: IQ, age of inmate, years of education, PCL-prim, SCL-GSI, reactive aggression, average amount of use of all drugs, family history of alcoholism, one central measure from each neurocognitive task entered in separate models

Table 4 Hierarchical regression analyses demonstrating contribution of neurocognitive measures to variance in Treatment Gain and Responsivity

Neurocognitive Measure	R^2 change	F change	N (df)	t
SCT: total % correct	.11	19.75**	164 (1,153)	4.44
SCT: average RT	.07	12.91**	164 (1,153)	3.94
CDMT: percent safe trials	.00	0.19	175 (1,164)	-0.43
CDMT: RT to. risky trials	.02	3.33*	173 (1,162)	1.83
Stroop: interference score	.01	2.02	140 (1,129)	1.42
FEEST: total correct	.00	1.01	175 (1,164)	-1.01
Cortisol:. change score	.00	0.23	106 (1,95)	0.48

The Sig. Covariates for each measurement in order are: famhx alc; n/a; phys abuse; famhx alc, phys abuse; reactive agg, famhx alc; famhx alc, phys abuse, age; and, age, psychopathy.

SCT Stop Change Task, CDMT Cambridge Decision Making Task, FEEST Facial Expressions of Emotion: Stimuli and Test, RT Reaction Time * $p<0.05$, ** $p<0.001$

Model 1: IQ, age of inmate, years of education

Model 2: IQ, age of inmate, years of education, history of physical abuse, PCL-prim, SCL-GSI, reactive aggression, average amount of use of all drugs, family history of alcoholism

Model 3: IQ, age of inmate, years of education, history of physical abuse, PCL-prim, SCL-GSI, reactive aggression, average amount of use of all drugs, family history of alcoholism, one central measure from each neurocognitive task entered in separate models.

Change in Reaction to Provocation Score

As seen in Table 6, less improvement in terms of reactions to provocation before and after the first treatment group was associated with fewer safe choices in the CDMT ($t = 2.03$, $p<0.05$).

Appendix 40

DISCUSSION

The most prominent finding from this research was that inmates exhibiting a relative lack of behavioral inhibition and inability to shift responses based on new information were less likely to progress favorably in a standard correctional treatment program, more likely to drop out early, and less likely to report improvement in aggressive reactions to provocation. Indicators of impulsivity included both the inability to respond correctly in the presence of a distracter stimulus and reaction time, which was significantly shorter in poor responders. This behavioral orientation has implications for social competency skills that may influence amenability to treatment and ultimate behavioral outcomes.

Impulsivity has been consistently found to act as an important risk factor in a wide range of high risk behaviors, including aggression and drug abuse (Dawe & Loxton, 2004; de Wit & Richards, 2004). Individuals with impulse dyscontrol disorders have difficulties in generating socially adaptive behaviors and executing skills to avoid aggressive responses or stressful interactions. Also, compromised impulse control over behavior may permit hostility, negative affective states, and other maladaptive responses to dominate behavior (Giancola, 1995). These dimensions of impulsivity may operate to interfere with the ability to engage and persist in treatment programs as well. Additional support for this finding would suggest that behavioral inhibition may be a prerequisite for program participation and retention,

particularly when interventions do not first reinforce the building blocks for effective behavioral inhibition. Thus, impulsivity may play a critical role in treatment responses which rely heavily upon the ability to resist impulses to engage in behavior that has yielded immediate intrinsic rewards (e.g., the control from aggressive behavior or euphoria from illicit drugs) despite longer term negative consequences. Recent data such as those presented in this study suggest the need to match interventions to relevant personality traits such as impulsivity to improve intervention outcomes in general (Moeller et al., 2001; Staiger, Kambouropoulos, & Dawe, 2007).

Table 5 Logistic regression model showing group differences between drop out and completion groups

Neurocognitive measure	Drop-outs N	Completers N	χ^2	Cox & Snell R^2
SCT: total % correct	57	81	4.61*	0.10
SCT: average RT	57	81	3.43*	0.09
CDMT: % safe trials	65	85	0.31	0.08
CDMT: RT to risky trials	65	83	14.98*	0.10
Stroop: interference score	44	73	0.88	0.08
FEEST: total correct	66	85	1.12	0.10
Cortisol change score	33	58	1.37	0.06

The Sig. Covariates for each measurement in order are: psyc problems x2; psyc problems, phys ab x3; phys ab; and, n/a.

SCT Stop Change Task, CDMT Cambridge Decision Making Task, FEEST Facial Expressions of Emotion: Stimuli and Test, RT Reaction Time * $p<0.05$

Statistics represent a test of the predictive power of the cognitive variable entered into the third block, after adjusting for block 1 (IQ, age, education) and block 2 (history of physical abuse, psychological problems in last 30 days)

Table 6 Hierarchical regression analyses demonstrating contribution of neurocognitive measures to variance in Change in Reaction to Provocation

Neurocognitive Measure	R^2 change	F change	N (df)	t
SCT: total % correct	.011	1.51	123 (1,112)	-1.23
SCT: average RT	.00	0.01	123 (1,112)	0.02
CDMT: percent safe trials	.028	4.11*	127 (1,116)	2.03
CDMT: RT to. risky trials	.02	2.67	125 (1,114)	1.63
Stroop: interference score	.00	0.21	105 (1,94)	-.46

FEEST: total correct	.001	0.077	127 (1,116)	0.28
Cortisol:. change score	.01	1.12	84 (1,73)	-1.06

The Sig. Covariates for each measurement in order are: hx emo abuse x2; hx emo abuse, hx phys abuse; hx emo abuse x4.

SCT Stop Change Task, CDMT Cambridge Decision Making Task, FEEST Facial Expressions of Emotion: Stimuli and Test, RT Reaction Time * $p<0.05$

Model 1: IQ, age of inmate, years of education

Model 2: IQ, age of inmate, years of education, history of physical abuse, history of emotional abuse, PCL-prim, SCL-GSI, average amount of use of all drugs, family history of alcoholism

Model 3: IQ, age of inmate, years of education, history of physical abuse, history of emotional abuse, PCL-prim, SCL-GSI, average amount of use of all drugs, family history of alcoholism, one central measure from each neurocognitive task entered in separate models

Impulsive responding on neurocognitive tasks similar to that used in this study has been consistently shown to recruit the brain's prefrontal cortex (PFC) and its neural circuitry (King, Tenney, Rossi, Colamussi, & Burdick, 2003; Martin & Potts,

2004; Watanabe et al., 2001) which regulates planning skills, sensitivity to consequences, impulse control, and other complex social behaviors. Development of the brain circuitry underlying impulse control is in transition throughout adolescence and into early adulthood; the PFC and its connections remain underdeveloped relative to other brain regions until about age 25 (Giedd, 2004). As a result, impulsive behaviors are developmentally expected in adolescence. Enhancing risk for developmental delays that may lead to enduring impulsive behavior is the heightened sensitivity to severe psychosocial and physical stressors (e.g., head injury, drug or alcohol use, deprivation, child abuse) during this critical developmental period (Chambers, Taylor, & Potenza, 2003). Evidence for this possibility is seen in adults with a history of trauma who exhibit high levels of impulsivity and other risk taking behaviors; several studies have reported PFC developmental delays or deficits in this population (e.g., Berlin, Rolls, & Iversen, 2005; Rodriguez-Jimenez et al., 2006; Spinella, 2004). Perhaps not coincidentally, therefore, physical and psychological trauma which can compromise PFC development and latter functioning is more prevalent in criminal offenders than in the general population (Blake, Pincus, & Buckner, 1995; Neller, Denney, Pietz, & Thomlinson, 2006). These findings provide one potential explanation for their high rates of impulsivity and, possibly for inmates' particular intractability to treatment.

Interventions may be more beneficial to the inmate population if they first address the level of

proficiency of an inmate's behavioral inhibition skills and their use of techniques for weighing consequences. Training in the prediction of outcomes and development of a future orientation among other related skills may, then, reinforce the ability to withhold impulsive responses and act on an assessment of consequences (Trad, 1993). Treatment program strategies to help inmates "slow down and think" and control impulsive reactions may be indicated given that the subgroup most likely to be unresponsive to treatment may be impulsive, resulting in a counterproductive decisions. Cognitive rehabilitation approaches may be particularly effective in addressing efficiency of behavioral responding. Remediation targets learning, attention, problem-solving, and visual-spatial skills using two approaches: repeated exposure to a task and/or the deconstruction of complex tasks into their simpler component parts. For example, components of a complex task such as scanning or psychomotor speed are trained separately and then integrated into performance on the complex target task. The training also focuses on memory and problem-solving, stressing the use of strategies such as forming images or drawing diagrams.

Another significant finding in this study is that stress reactivity, as measured by cortisol levels, predicted treatment readiness, consistent with van de Wiel, van Goozen, Matthys, Snoek, and van Engeland (2004) and Zimmermann, Blomeyer, Laucht, and Mann (2007); lower cortisol reactivity was associated with self evaluations of lower

readiness. Abnormally high levels of cortisol release are related to acute stress and anxiety, however, relative cortisol insensitivity may be reflective of either a genetic propensity to lower stress reactivity or a dampening of stress responses that can occur after chronic exposure to stressful situations. It is also possible that a stress response or some level of negative affect is required to engage in treatment (McKay, Alterman, & Mulvaney, 1999). This study cannot determine the origins of low stress responses in those who performed less well in treatment. However, given that chronic or severe stressful experiences are known to (a) produce cognitive impairment and stress response dampening, (b) dysregulate emotional responses, (c) increase the likelihood of recidivism and relapse, and (d) interfere with treatment benefits, approaches to minimize the impact of stress may eventually prove to be a critical component of treatment for affected inmates. Cortisol dysregulation as one index of physiological stress reactivity has been found to be malleable in response to interventions. For example, Fisher, Gunnar, Chamberlain, and Reid (2000) and other investigators provide evidence for the impact of a targeted intervention on cortisol (Bruce, Kroupina, Parker, & Gunnar, 2006; Gunnar, Morison, Chisholm, & Schuder, 2001; Hammerfald et al., 2006; Mommersteeg, Keijsers, Heijnen, Verbreaak, & van Doornen, 2006). There are also potential implications for altering autonomic reactivity in general with appropriate interventions (e.g., McCraty, Atkinson, Tomasino, Goelitz, & Mayrovitz, 1999; Raine, 1996), suggesting a possible mediating

role for stress responsivity. Nevertheless, the relationship between stress and perceived treatment readiness is still a poorly understood phenomenon.

Other Related Findings

IQ did not relate to treatment outcomes and most of the models remained significant with its inclusion, suggesting that higher order cognitive functions, and not subservient cognitive functions, played a more direct role in treatment engagement outcomes. Also, younger inmates fared better in treatment, but total months in prison were not predictive of outcomes. This finding may be interpreted to suggest that younger inmates may be more tractable irrespective of how long they have been in prison. Additional background variables were similarly unrelated directly to treatment outcomes, including education, duration of total prison time, family history of criminality and mental illness, drug abuse history, and psychopathy. On the other hand, there was a general pattern for physical abuse and psychological problems in the last 30 days to contribute independently to poor treatment response. In light of the extant research on this subject, it is critical that treatment providers consider childhood trauma and its related psychological manifestations as possible concomitant conditions that can potentially disengage inmates from treatment and result in diminished amenability to program demands. Nevertheless, when these factors were included in models with neurocognitive and

emotional regulation measures, they did not retain their significance. And importantly, although various measures from each of the neurocognitive and emotional regulation tasks significantly predicted particular treatment outcomes and low cortisol responses also predicted treatment completion (data not shown), these factors also did not retain their significance with the inclusion of relevant covariates in the models. These results suggest the potentially influential role of disinhibition in treatment engagement over and above other inmate characteristics.

Interestingly, self evaluations of treatment readiness differed from social worker evaluations and were not predictive of actual treatment performance indicators. We speculate that those inmates who have an inflated sense of how well they may fare in treatment may be at particular risk for negative outcomes. It may also be relevant that a robust cortisol response to a stressor typified those who evaluated themselves as being highly treatment ready. Based strictly on years of observations of prisoners, this finding may suggest that inmates who report being treatment ready and who have lowered stress responsivity may be less able to predict their performance in treatment, and less enthusiastic and compliant. Inmates with a higher cortisol response and who report less treatment readiness may simply be more committed to change and anxious about their ability to perform well; i.e., they may have a higher level of responsivity to social stimulation. The implications of this finding for treatment will be explored in future research.

FINAL REMARKS

There are several limitations in this study. High levels of noncompletion in prison treatment programs make it difficult to assess the 'effects' of treatment on cognitive functioning or any other measure. On the other hand, this study intended to predict individual differences in level of engagement, persistence, and improvement in a correctional treatment program, which may be more reflective of the inmates' baseline willingness and ability to respond favorably and not the effects of any given treatment approach. Similarly, the lack of a placebo control group limits conclusions to some extent; however, the purpose of this study was to compare inmates with varying levels of participation rather than evaluate the treatment program. Another shortcoming is that there is no method by which we could assess selection bias. Inmates were referred to the study team based on preexisting criteria, thus, a comparison of inmates referred with those who were not referred was not possible. The response rate was exceedingly high, however, in that all of those recruited and considered eligible participated in the research. Also, use of self reports to evaluate behaviors, including nature and extent of drug use, and psychological traits is not ideal without corroboration or more extensive testing. Primary measures, however, were performance tasks and not prone to errors due to recall, selective memory, bias, and other common issues in surveys.

In short, our findings tentatively suggest that behavioral disinhibition may be informative in identifying treatment readiness preparations that are necessary for inmates to be able to respond to existing intervention strategies. Replications of these preliminary findings would indicate that new approaches to correctional treatment may include a cognitive neurorehabilitation component designed to enhance connectivity between neural systems and strengthen these malleable cognitive and emotional regulatory functions to more effectively modify behavior in inmates. Incorporation of this knowledge into criminal justice policies and practices may eventually alter their course substantially, dramatically improving agencies' ability to assess, detect, and treat offenders who are currently considered intractable. (Note that if this represented only 10% of inmates in custody in the US, based on Bureau of Justice Statistics December 2005 statistics, this would affect about 219,000 individuals).

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